

tudes of them are collected together it can be heard in still weather 'several hundred yards from the water.'"

The drum of which Holbrook writes is *Pogonias cromis* Linne, 1766.

(G) Note by Prof. A. E. Verrill, of Yale University, New Haven, Conn. (dated May 31, 1898):

There are numerous fishes, both marine and fresh water, that are capable of making sounds of considerable volume under water. Such fish noises might very well account for many instances of the noises referred to. The drum fishes, the "grunts," are good "examples of sound-producing fishes."

(H) To the preceding note by Dr. Garman the editor would add the suggestion that the intensity and character of the sound, as heard in the air, will depend somewhat upon the relation between the depth of the fish in the water and the pitch of the note uttered by it.

Just as the vibrating column of air in an organ reed pipe produces the greatest effect when it is in perfect unison with the vibrating tongue at the base, so it is with the column of water above the drum fish. An open organ pipe that is controlled by a spring or reed that vibrates to the lowest C of the bass clef, namely, thirty-two times per second, must have a length of 16 feet. The same pipe, if filled with fresh water, may be longer in the ratio 4708/1093, viz, the ratio between the velocity of sound in air and water. This gives a depth of about 70 feet at which the drum fish that strikes the bass C could produce the maximum noise as heard by the observer. If, now, the bottom of the water is 70 feet below the fish then he is at a nodal point, and the whole column vibrates in sympathy with him.—Ed.

(I) Prof. William F. Ganong writes from Northampton, Mass., as follows, May 31, 1898:

I can not in the least accept your suggestion about the drum fish. It is true I have never heard this animal perform, but the sounds come from too far off and are too great to be made by a fish. On hills a quarter of a mile from the sea I have heard them, and the sound filled the air. Your mode of investigating them by the tubes would be difficult in practice, since the sounds come so rarely; days will pass without our hearing them, and even on favorable days they occur only once in a while, perhaps once in a day, but at the best they occur several hours apart as a rule; in fact, they may be described as rare and irregular. Hence, one would have to be on constant guard at the tube for hours and even days together. Mr. McLaughlin, of Document B, is a man for whose powers of observation and reliability I have the greatest respect, and his letter is, therefore, an important contribution to this subject.

(J) Instead of accepting any hypothetical explanation as satisfactory, it is best, at the present stage of the investigation, to keep one's mind free from prejudice in any special direction. It seems quite possible that the noises proceeding from the ocean may have very different characters and origins; some are undoubtedly due to the drum fish; others are made by the breakers dashing on rocky cliffs, whence heavy thuds spread for several miles through the air and many miles farther through the ocean; others are due to the cracking of rocks in ledges near the surface, such as those on which lighthouses are built; others, finally, are occasionally due to genuine earthquakes occurring at the bottom of the neighboring ocean. It is highly probable that a careful collation of observations from many stations in any given locality, such as the Bay of Fundy, will throw a clear light upon the locality whence the noises emanate.

In this connection it is worth calling to mind that there are eight or ten well-defined regions on the North American Continent within each of which there is a so-called center of seismic disturbance. There is no reason why similar centers should not exist under the ocean; in fact, the great solitary waves that have been frequently reported by vessels between New York and Newfoundland, and which have generally been plausibly explained as due to a combination of several ordinary waves, may sometimes be due to suboceanic earthquakes, just as similar great waves are known to have been produced by earthquakes in the Pacific.—Ed.

METEOROLOGICAL WORK IN ALASKA.¹

By A. J. HENRY, Chief of Division.

The meteorological work in Alaska and contiguous territory prior to the establishment of a weather service by the United States was admirably summarized in 1879 by Dr. William H. Dall, in his contributions to the Pacific Coast Pilot, published by the United States Coast and Geodetic Survey. The following remarks relate more especially to the work of recent years.

In the summer of 1872 the Federal Government sent a special agent to the Pribilof Islands for the purpose of studying the life and habits of the fur seal, concerning which little was then known.

As a promising field of collateral investigation the Signal Service, under the direction of Gen. A. J. Myer, began a series of meteorological observations on the island of St. Paul in August of the same year. The instructions given to the first observer detailed for duty in Alaska, Mr. Charles Pattison Fish, were very comprehensive. In addition to his daily routine duties, which included the making of six meteorological and certain special tidal observations, he was to keep accurate memoranda on a variety of subjects, some of which had only a remote connection with meteorology.

Mr. Fish remained on the island until the summer of 1876, when he was relieved by Mr. Edward J. Gill. The latter perished on October 22 of the same year in an attempt to reach his quarters during a violent storm. Shortly after the death of Mr. Gill observations were resumed by an employee of the Alaska Commercial Company and continued with some interruptions until June 30, 1883, when they were finally discontinued by the Signal Service. It is understood, however, that meteorological observations have since been made by the company above named, in fact, a more or less complete register, extending from September, 1892, to June, 1895, made by that company, was sent to the Weather Bureau in 1895.

After the occupation of St. Paul, in 1872, meteorological stations of the first order were next established at Fort St. Michael in 1874, Unalaska in 1878, Atka in 1879, and Sitka in 1881.

Interest in meteorological work in the arctic regions was greatly stimulated in all quarters by the discussions of the International Geographical and Meteorological Congresses of 1879-81, and especially by the action of the congress in formulating plans for the establishment of an international chain of magnetic and meteorological stations at high latitudes. The part taken by the Signal Service in the general scheme of international work is a matter of history, the details of which have been fully published elsewhere. As supplementary to the main work at high latitudes active operations were begun with a view of increasing the number of observing stations in Alaska. The formal order on the subject, approved March 16, 1881, follows:

INSTRUCTIONS No. 31.

There will be establishment in Alaska, under the supervision of the Signal Service observers on duty there, substations and third-class stations, as follows:

¹ The importance of extending our daily weather map to the greatest possible extent, so as to include all the circumstances attending our storms and cold waves, was deeply impressed upon our attention during the progress of the work of the Signal Service in 1871, and the Chief Signal Officer, Gen. A. J. Myer, willingly accepted the idea of taking the most generous possible interpretation of our privileges and duties in this respect. The limit covered by our system of observing stations was first extended in June, 1871, by distributing forms to masters of vessels along the Atlantic Coast; in 1872 the first steps were taken toward securing data from Alaska; and in 1873 General Myer began the organization of the international system of simultaneous meteorological observations which soon covered the whole Northern Hemisphere. It is to be hoped that the publication of the International Bulletin has done much to stimulate the study of the atmosphere as a whole. Climatology may deal with very restricted localities, but meteorology must consider the whole atmosphere.—Ed.

From Sitka, substations at Yakutat Bay, Portage Bay, and Cordova Bay; third-class stations at four (4) points to be selected by the observer at Sitka.

From Unalaska, substations at Atka, Kenai, Port Etches (Nutchek), and Kuskokvim; third-class stations at four (4) points to be selected by the observer at Unalaska.

From St. Michael, substations at Fort Yukon and Nulato; third-class stations at three (3) points to be selected by the observer at St. Michael.

Substations will be furnished with one (1) of each of the following named instruments: aneroid barometer, exposed, maximum and minimum thermometers, anemometer, and rain gauge, and will take the 3 p. m. and 11 p. m., Washington mean time observations.

Third-class stations will be furnished with one (1) of each of the following named instruments: maximum and minimum thermometers and rain gauge, and will take one (1) observation daily at about sunset.

The reports from the above mentioned sub and third-class stations will be collected by the Signal Service observers at the central points named above, and will be, after examination, in order to correct apparent errors in methods of recording, forwarded by them to this office.

(Signed)

W. B. HAZEN,
Brigadier and Brevet Major-General,
Chief Signal Officer, U. S. A.

In establishing new stations in a country so sparsely settled as Alaska, great difficulty must necessarily be experienced in securing suitable observers. In the present case but two classes could be drawn upon, viz, missionaries and post traders. The former, while mentally well equipped for the light duties required, spent much time in traveling throughout their fields of labor and were consequently unable to make observations continuously. The post traders, while generally able and willing to make simple observations of temperature and precipitation during the closed season, were not willing to continue throughout the open season for the small compensation allowed.

As a result of the efforts put forth in 1881-1882 about 25 stations were established, the majority of which, however, were on or near the coast. The meteorological service thus created was maintained until the spring of 1886. At this time its further existence was greatly jeopardized by the withdrawal of the active support of the Northwest Trading Company. The latter, having sold or abandoned the majority of its posts, was not in a position to extend the material aid it had formerly given. This fact, and possibly the increasing need elsewhere of the services of the regular observers stationed in Alaska, as well as a diminution in the appropriations, led to the abandonment of all stations in that Territory, except Sitka, in the early summer of 1886. Sitka was abandoned a little more than a year later, viz, in September, 1887, thus terminating the work of the Signal Service in Alaska.

In recent years quite a number of persons, either resident in Alaska or moving thither, have been supplied with meteorological instruments by the Weather Bureau. The returns from these instruments have been meager; in some instances no observations whatever appear to have been made.

The accompanying table shows the stations in Alaska and contiguous territory from which meteorological observations have been received up to the end of 1897, the latitude, longitude, and elevation of the stations, where known, and the period during which observations were made. The notes in the column "Remarks" indicate, as fully as possible in the limited space available, the nature of the observations made at each station.

The observations at second order stations include pressure, temperature, wind, weather, cloudiness, precipitation, relative humidity, and the usual phenomena recorded by stations of that class. The third order stations were divided into two groups or sections; at stations of the first group two observations were made daily, namely, of pressure, temperature, clouds (amount only), state of weather, precipitation, and a single reading of the anemometer dial giving the total daily wind travel; at stations of the second group a

single observation of the state of the weather, the daily extremes of temperature, and the amount of precipitation, if any, was made.

For the sake of completeness a list of Asiatic stations taken from the Pacific Coast Pilot, Alaska, Appendix Meteorology, compiled by Dr. W. H. Dall, Assistant U. S. Coast Survey, and a similar list of stations in the Northwest Territory, compiled from the publications of the Meteorological Service of the Dominion of Canada, Prof. R. F. Stupart, director, have been added.

THE ALASKAN SECTION OF THE CLIMATE AND CROP SERVICE.

[Extracts from Official Orders.]

In order to respond to the recent demand for meteorological information, the present Chief of the Weather Bureau has lately established an Alaskan section of the Climate and Crop Service. Mr. Hector D. Ball has been appointed section director, in cooperation with Professor Georgeson, who will establish an agricultural experiment station near Sitka. Under instructions of April 7, Mr. Ball proceeded to Sitka, where he arrived on May 6. He is required to establish "an efficient climatic service in the Territory of Alaska and also as far as practicable establish and maintain a regular station of the Weather Bureau at Sitka or some other desirable point." This latter station will need a building that will be erected by Professor Georgeson in connection with his agricultural experiment station. This central station will be provided with self-registers for wind velocity and sunshine, a barograph and thermograph, and all the other apparatus of a first-class station. Apparatus for the establishment of ten subsidiary stations during the present season is also furnished. These will be voluntary stations, reporting directly to Mr. Ball. It is hoped that those to whom instruments have been issued from time to time in previous years will also revive their interests and report to him. The accompanying lists of those that have either promised or actually maintained voluntary stations is of importance to those interested in the climate of Alaska.

For the present, in view of the great amount of work necessary in the way of visiting and instructing voluntary observers, the station at Sitka will, by cooperation with Professor Georgeson, be only able to keep the record of observations at 8 a. m. and 8 p. m., which will serve as a base for the correction of the readings from the barograph and thermograph.

The following list has been furnished to Mr. Ball for his information in hopes that all the voluntary observing stations in Alaska and the Northwest Territory that have been furnished with instruments by the Weather Bureau may be brought into successful activity. As several of these have not been heard from for some time it is requested that any one who knows of the location of these instruments or observers will report the fact to the Chief of the Weather Bureau at Washington, D. C. The numbers of the instruments are given when practicable in order to assist in their identification.

VOLUNTARY STATIONS IN ALASKA AND NORTHWEST TERRITORIES.

Anvik.—Rev. John W. Chapman, observer, not heard from for several years.

Birch Creek.—H. H. Pitts, observer; has exposed No. 1044; maximum No. 2422; minimum No. 2021; barometer No. 203; and rain gauge No. 2327, issued December, 1894; sent care of Alaska Commercial Company, No. 310 Sanson street, San Francisco, Cal.; instruments were seized by customs authorities at Forty Mile, N. W. T.; Canadian authorities requested to liberate same April 13, 1896; no reports.

Cape Prince of Wales.—..... Exposed Nos. 83 and 316; maximum No. 1350; minimum No.

1267; aneroid barometer No. 191; and rain gauge No. 300; issued June, 1890; observer murdered by the natives August 19, 1893, and instruments supposed to have been destroyed.

Coal Harbor.—H. S. Tibbey, observer; reports now being received; has anemometer No. 150; exposed No. 226; maximum No. 1369; minimum No. 1265; rain gauge No. 297; and barometer No. 230; barometer was returned to Sacramento, in 1894, for repair.

Circle City.—Observer to be selected by Seattle-Yukon Transportation Company, Seattle, Wash., through whom instruments, etc., are to be located at Circle City, Dawson City, and Munook; instruments sent to observer, Seattle, Wash., to be turned over to the Transportation Company; instruments issued March, 1898.

Dawson City.—See note for Circle City.

Holy Cross Mission.—F. Monroe, observer; station established through Rev. Pascal Tosi; has exposed No. 3465; maximum No. 3501; minimum No. 3165; barometer and rain gauge, numbers not given; last report received July, 1897.

Killisnoo.—Jos. Zuboff, observer; has exposed Nos. 611 and 1463; maximum No. 2398; minimum No. 3252; aneroid barometer No. 162; and anemometer No. 420; established June, 1889; reports being received; last one for February, 1898.

Juneau City.—Gus. B. Leach, observer, "Alaska Mining Record," has exposed Nos. 991 and 1464; maximum No. 3969; minimum No. 3638; and rain gauge No. 2291; were issued October, 1894; last report received for February, 1897.

Kadiak Island.—Hon. Alphonso C. Edwards, observer; has maximum No. 4574; minimum 3647; and barometer No. 341; instruments issued from San Francisco, Cal., in 1896; last report received for August, 1896.

Kowak River.—Robert Samms (a Friend missionary), observer; has maximum No. 4026; minimum No. 4498; instruments issued from San Francisco, Cal., in June, 1897; no reports as yet.

Munook.—See note for Circle City.

Ogilvie, N. W. T.—Jos. Ladue, observer; has exposed No. 1917; maximum No. 3990; minimum No. 1571; and rain gauge No. 2337; see note relative to seizure of instruments for Birch Creek; instruments for this station and for Selkirk seized at the same time; same action; no reports.

Point Hope.—Rev. E. H. Edson, observer, care S. Foster & Co., No. 28 California street, San Francisco, Cal.; has maximum No. 3862; minimum No. 3547; and rain gauge No. 2240; issued May 24, 1894; last report received for July, 1896.

Port Clarence.—J. C. Widstead, observer; has maximum No. 4226; minimum No. 2132; barometer No. 328; and rain gauge No. 2154; issued May 24, 1895; last report received September, 1897.

St. Joseph Mission.—J. M. Trece, observer (established through Rev. Pascal Tosi); has exposed No. 3679; last report received for July, 1896.

St. Lawrence Island.—V. C. Gambell, observer; has exposed Nos. 1830 and 2204; maximum No. 3850; minimum No. 3507; and rain gauge No. 1671; issued from San Francisco, Cal., in May, 1894; last report received for February, 1897.

St. Peter's Mission (Nulato).—F. Monroe, observer (established through Rev. Pascal Tosi); no record of instruments forming equipment, though presumed to be from among those sent out with Father Tosi; last report received for April, 1896.

Selkirk, N. W. T.—A. Harper, observer; has exposed No. 1879; maximum No. 4016; minimum No. 1373; barometer No. 448; and rain gauge No. 2318; these instruments were among those seized at Forty Mile, as stated in note under Birch Creek.

Two trading posts on the Yukon; Mr. Weare and Captain Healy, President and Manager, respectively, of the North American Transportation and Trading Company, St. Michael, Alaska; the instruments issued are maximum Nos. 4157 and 4159; minimum Nos. 2054 and 2057; rain gauges Nos. 2285 and 2297; these were sent out in June, 1895; no reports received.

Index of records of meteorological observations made in Alaska from the earliest dates to January 1, 1898.

Stations.	Latitude.	Longitude.	Elevation above sea level.	Record.			Remarks.
				Length.	From—	To (inclusive)—	
	° ' "	° ' "	Feet.	Yrs. Mos.			
Point Barrow (Ooglaamie).....	71 17	156 40	17	2 0 1 9	Sept., 1852 Oct., 1881	Aug., 1854 Aug., 1883	Temperature (maximum, minimum, mean). 2d order.
Omlak	65 00	162 57	.....	1 0	Jan., 1884	April, 1885	3d order, one observation daily.
Tuklukyet (Nuklukayet, Tanana).....	65 10	152 45	.....	3 3	Aug., 1882	May, 1886	3d order, two observations daily.
Belle Isle (Tchatawklun).....	65 30	142 38	.....	2 2	Oct., 1882	May, 1886	Do.
Fort Reliance	64 10	139 25	.....	1 6	Sept., 1880	May, 1881	Temperature, wind, weather.
				1 6	Sept., 1882	May, 1886	3d order, one observation daily.
Fort St. Michael, on St. Michael Island	63 28	161 48	30	2 0	Oct., 1865	July, 1874	Temperature observations at 8 a. m., 3 and 9 p. m.
Mission	62 55	161 05	.....	12 0	June, 1874	June, 1886	Pressure, temperature, rain, snow, wind, weather.
Anvik	62 37	160 08	.....	2 3	Aug., 1883	May, 1886	3d order, full reports.
				2 3	Sept., 1882	May, 1885	3d order, one observation daily.
Redoubt Kolmakof (Koskokvim).....	61 50	157 58	.....	0 2	Sept., 1887	Mar., 1891	Do.
				0 2	Dec., 1843	Feb., 1844	Fragmentary records.
Fort Kenai (Kenai).....	60 32	151 19	80	2 9	July, 1882	May, 1886	Temperature and weather.
Port Etches	60 18	146 30	.....	0 2	July, 1870	Aug., 1870	3d order, two observations daily.
Fort Alexander	58 57	158 18	38	3 5	Jan., 1883	May, 1886	Temperature, rain, snow, clouds, and wind.
Chilkat (Pyramid Harbor)	59 20	135 30	.....	1 4	May, 1883	Aug., 1884	3d order, two observations daily, aneroid barometer.
Chilkat (Pyramid Harbor)	59 20	135 30	.....	3 0	Aug., 1881	June, 1885	Do.
Juneau (Harrisburg)	58 19	134 28	.....	0 11	July, 1885	June, 1886	3d order, two observations daily.
				6 2	Sept., 1881	Dec., 1887	2d order, mercurial barometer.
				2 2	June, 1881	Oct., 1884	3d order, two observations daily, aneroid barometer.
				3 8	July, 1888	Feb., 1897	3d order, two observations for a portion of the time.
St. Paul Island.....	57 10	170 01	40	5 1	Aug., 1839	Aug., 1844	Temperature, precipitation, relative humidity, clouds, wind, and weather.
Do	57 10	170 01	57	1 9	Nov., 1869	Dec., 1871	Temperature.
				8 8	Aug., 1872	May, 1883	Temperature, rain, snow, and wind.
				8 8	Sept., 1892	June, 1895	2d order, full observations.
Ugashik	57 38	157 45	.....	2 3	Aug., 1883	Jan., 1886	Pressure, temperature, wind and weather, ocean swell (Alaska Commercial Company).
Killisnoo (Hoochnahoo)	57 23	134 29	.....	13 6	May, 1881	Mar., 1898	3d order, one observation daily.
				45 2	Jan., 1828	Dec., 1876	1881-88, 3d order, two observations daily, pressure, temperature, precipitation, wind, clouds, weather.
Sitka	57 03	135 19	63	6 5	April, 1881	Sept., 1887	Pressure, temperature, rain, snow, clouds, vapor pres- sure, wind.
Bering Island	55 12	165 55*	20	5 0	May, 1882	May, 1886	2d order, full observations.
Marshovo (Marzovia)	55 03	163 10	.....	1 5	Nov., 1881	May, 1883	Do.
				8 10	Jan., 1825	May, 1834?	3d order, one observation daily.
Unalakpa (Ililulik Village).....	53 53	166 32	13	2 3	Nov., 1866	Sept., 1874	Pressure, temperature, rain, snow, relative humidity, wind, etc.
				6 2	Aug., 1878	May, 1886	2d order, full observations, except from June, 1881, to March, 1882, when 3d order of two observations.

Index of records of meteorological observations made in Alaska—Continued.

Stations.	Latitude.	Longitude.	Elevation above sea level.	Record.			Remarks.
				Length.	From—	To (inclusive)—	
	° ' "	° ' "	Feet.	Yrs. Mos.			
Atka (island).....	52 15	174 15	.....	0 4	May, 1879	Aug., 1879	2d order, no barometer.
Kyska (island).....	51 59	177 37*	.....	3 7	Oct., 1881	May, 1885	3d order, two observations daily, aneroid barometer.
Nulato.....	64 41	157 58	100	0 4	May, 1886	Aug., 1886	3d order, two observations daily.
Hoonyah.....	59 45	140 00	.....	1 0	May, 1885	May, 1886	3d order, two observations daily, aneroid barometer.
St. George Island.....	56 37	169 37	.....	0 5	Feb., 1843	June, 1843	Temperature, snowfall, weather.
Fort Wrangell.....	56 30	132 28	25 to 35	6 0	Dec., 1866	May, 1867	Pressure, temperature, wind.
Cordova Bay (Jackson, Howkan).....	54 45	133 00	.....	0 4	Jan., 1896	April, 1896	Pressure, temperature, clouds, wind, weather.
Chernofski Harbor.....	53 25	167 14	.....	0 1	Mar., 1882	Mar., 1882	Fragmentary record.
Attu (island).....	52 58	173 00	.....	4 8	May, 1868	May, 1877	Pressure, temperature, rain, snow, clouds, wind, weather.
Choris Peninsula.....	66 13	161 46	.....	0 10	Sept., 1881	Aug., 1882	Temperature.
Ikogmut.....	61 47	161 14	50 to 100	0 3	Aug., 1882	Dec., 1882	Fragmentary record.
Port Moller on Moller Island.....	56 01	160 47	12	0 5	Oct., 1881	Feb., 1882	Do.
St. Paul (Kadiak Island).....	57 47	152 20	.....	2 8	July, 1880	May, 1881	Do.
Fort Tongass.....	54 46	130 30	20	9 0	Aug., 1849	May, 1850	Mean temperature only.
Unalaklik.....	63 54	160 45	20	0 3	Sept., 1843	Dec., 1854	Temperature, rainy and snowy days, wind, weather.
Fort Yukon.....	66 34	145 18	412	0 5	Dec., 1877	April, 1878	Pressure, temperature, wind, rain, and snow.
Yukon Delta.....				2 8	Jan., 1869	Dec., 1873	Pressure, temperature, rain, snow, wind, weather.
Camp Davidson†.....				1 0	July, 1881	Aug., 1890	Temperature, precipitation.
Camp Colonna†.....				0 9	Nov., 1895	Aug., 1896	Pressure, temperature, precipitation, clouds, wind, and weather.
Port Clarence.....	65 17	166 20	.....	2 7	June, 1868	Dec., 1870	Pressure, temperature, rain, snow, wind, weather.
Cape Prince of Wales.....	64 30	156 00	.....	0 3	Nov., 1886	Jan., 1867	Temperature.
St. Peter's Mission.....	63 34	171 45	.....	0 6	Jan., 1861	July, 1861	Temperature, precipitation.
St. Lawrence Island.....	63 25	166 38	.....	0 1	Aug., 1869	Aug., 1869	Pressure, temperature.
Point Hope.....	63 25	166 38	.....	1 0	Jan., 1870	Dec., 1870	Temperature.
Metlakatla (British Columbia).....	54 11	130 17	.....	0 5	Jan., 1895	May, 1895	Do.
Holy Cross Mission.....	63 28	162 04	.....	1 10	Sept., 1889	June, 1891	Temperature (mean, maximum, minimum), clouds, precipitation, pressure, wind, etc.
Unga Island (Coal Harbor).....	55 20	160 28	30	2 0	Oct., 1889	June, 1890	Temperature (maximum, minimum, mean), precipitation, pressure, wind, etc.
St. Joseph's Mission.....	62 15	163 45	.....	2 0	July, 1850	June, 1852	Temperature.
Kotzebue Sound.....	66 58	165 07	15	2 0	July, 1895	Dec., 1897	Pressure, temperature, precipitation, clouds, wind, weather.

STATIONS IN CONTIGUOUS BRITISH TERRITORY.

Fort Constantine.....	.....	.....	.....	0 8	Nov., 1895	June, 1896	Temperature (mean, maximum, minimum).
Good Hope.....	.....	.....	.....	0 9	Oct., 1885	Jan., 1887	Temperature.
Fort Chippewyan.....	58 43	111 19	.....	.....	1883	1887	Temperature, precipitation.
Fort Dunnegan.....	55 56	119 02	.....	.....	1880	1884	Temperature (mean, maximum, minimum), precipitation (rain and snow).
Fort Rae.....	62 39	115 44	.....	1 0	Sept., 1875	Aug., 1875	Temperature (mean, maximum, minimum), cloudiness, precipitation (rain and snow), wind.
Lesser Slave Lake.....	55 20	115 30	.....	.....	1884	1885	Temperature (mean, maximum, minimum), precipitation (rain and snow).
Fort Simpson.....	61 52	121 25	.....	0 7	May, 1875	Nov., 1875	Temperature (mean, maximum, minimum), wind, cloudiness, precipitation.
Queen Charlotte Island (at Massett).....	52 20	131 11	.....	0 2	Jan., 1863	Feb., 1863	Temperature, precipitation, wind, clouds.
Fort Franklin (Hudson Bay).....	65 11	123 12	.....	1 9	Sept., 1825	May, 1827	Mean temperature only.

ASIATIC STATIONS (PACIFIC COAST PILOT).

Port Aian.....	56 27	138 11*	40 to 50	5 4	June, 1843	Dec., 1850	Pressure, temperature, wind, and weather.
Ala River.....	54 33	135 58*	10 to 15	0 3	April, 1831	June, 1831	Do.
Anadyr River.....	64 55	177 19*	20	0 9	Oct., 1866	June, 1867	Do.
Duë Lighthouse.....	50 50	147 07*	300 to 350	2 0	Jan., 1866	Dec., 1868	Do.
Hakodadi.....	41 47	140 45*	30 to 150	1 6	Jan., 1874	Jan., 1875	Pressure, temperature, wind, and weather.
Kusunai.....	47 59	142 20*	.....	4 4	Jan., 1859	May, 1863	Do.
Muravieff.....	46 48	142 30*	.....	1 0	July, 1867	July, 1868	Do.
Nikolaieffsk.....	53 08	140 43*	54 to 102	1 0	July, 1868	July, 1869	Temperature, wind, weather.
Okhotsk.....	59 20	142 40*	12	6 9	Jan., 1866	Dec., 1873	Pressure, temperature, wind, weather.
Petropavlovsk.....	53 01	158 39*	37 to 50	7 8	May, 1828	Dec., 1850	Do.
Port Providence (Plover Bay).....	64 30	173 06	.....	1 0	Jan., 1828	Dec., 1828	Do.
Udsk.....	54 29	134 37*	.....	3 11	July, 1882	Aug., 1886	3d order, two observations daily, aneroid barometer.
				0 10	Oct., 1848	Aug., 1849	Temperature.
				0 5	Nov., 1829	Mar., 1830	Temperature, pressure, wind, weather.

* East.

† Observations by United States Coast Survey parties.